

THERMISTOR DEVICE, THERMISTOR DEVICE MANUFACTURING METHOD
AND TEMPERATURE SENSOR

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ABSTRACT OF THE DISCLOSURE

10 The thermistor portion of a thermistor device
consists of a mixed sintered body of
 $aY(Cr_{0.5}Mn_{0.5})O_3 \cdot bAl_2O_3$ made of the perovskite-type
compound $Y(Cr_{0.5}Mn_{0.5})O_3$ and Al_2O_3 , or a mixed sintered
body of $aY(Cr_{0.5}Mn_{0.5})O_3 \cdot b(Al_2O_3 + Y_2O_3)$ made of
15 $Y(Cr_{0.5}Mn_{0.5})O_3$, Al_2O_3 and Y_2O_3 . The mole fractions a
and b have the relationships $0.05 \leq a < 1.0$, $0 < b \leq 0.95$ and
 $a + b = 1$. This is required to obtain a thermistor device
that has stable characteristics and exhibits a small
change in its resistance value, even in a heat history
from room temperature to 1000°C or the like, and also has
20 a resistance value of 50 Ω to 100 k Ω in the temperature
range from room temperature to 1000°C.

The precursor compounds triethoxy yttrium, diethoxy
manganese and tris (2,4-pentadiono) chromium are mixed in
a mixed solvent of ethanol and isopropyl alcohol, and
25 refluxing is performed to obtain a composite metal
alkoxide solution. Then the metal salt precipitating
agent of deionized water is added, the mixture is stirred
and mixed and refluxing is performed to obtain a
gelatinous precipitate of metallic salts containing Y, Mn
30 and Cr. This precipitate is separated by filtration,
dried and calcined to obtain powdered raw material with a
composition of $38Y(Cr_{0.5}Mn_{0.5})O_3 \cdot 62Y_2O_3$, the same as
that of a thermistor device. Thereafter, this powdered
raw material is molded and sintered to obtain the
35 thermistor device as a sintered body. Thereby, the

dispersion of the resistance value of the thermistor can be reduced.

An anti-reducing coating made of an anti-reducing material such as Y_2O_3 , Al_2O_3 , $Y_3Al_5O_{12}$, $3Al_2O_3 \cdot SiO_3$, Y_2SiO_5 or the like is formed on the surface of a thermistor portion consisting of a mixed sintered body of $Y(CrMn)O_3 \cdot Y_2O_3$ (or $Y(CrMn)O_3 \cdot Al_2O_3$) or the like to form a thermistor device with a pair of lead wires attached. Thereby, the thermistor device exhibits resistance value stability even when subjected to a reducing atmosphere.